

wherein said plurality of keys is arranged in an array having a horizontal key spacing, centerline to centerline, between adjacent keys, of 10.8 to 16.4 millimeters, a vertical key spacing, centerline to centerline, between adjacent keys of 10.8 to 18.0 millimeters; and wherein the keystroke travel range of said keys is [at least] about 0.9 to 6 millimeters.

24. (Once amended) The ergonomic input apparatus of claim [22] 23 wherein the alphabetic keys are arranged in a qwerty layout.

27. (Once amended) The ergonomic input apparatus of claim [26] 24 wherein the keystroke travel range of said keys is 1.2 to 3.44 millimeters.

The following remarks are submitted in response to the Final Office Action mailed May 2, 1996.

REMARKS

Claims 1-19,21-25 and 27-28 are pending in the application. The specification has been objected to under 35 USC § 112, first paragraph. Claims 24 and 28 stand rejected under 35 USC § 112, first paragraph. Claims 1-28 are rejected under 35 USC § 112, second paragraph. Claims 1-28 stand rejected under 35 USC §103 and the judicially created doctrine of obviousness-type double patenting.

Reconsideration of the application and present claims are respectfully requested in view of the following comments.

Specification -- 35 U.S.C. § 112, first paragraph

The objection to the specification under 35 USC § 112, first paragraph, is respectfully traversed.

The “Dvorak” keyboard layout is well known to those skilled in the art. According to the *McGraw-Hill Dictionary of Scientific and Technical Terms*, 5th Edition, 1994, p. 628, a Dvorak keyboard is defined as “[a] keyboard whose layout is altered from that of the standard qwerty keyboard to speed up typing; more of the frequently used keys are on the home row.” The dictionary further includes a figure of the layout of the keyboard (see Exhibit A). Thus the term Dvorak keyboard is a common, ordinary and understood term.

Similarly, the “qwerty” keyboard layout is well known to those skilled the art. As evidenced by the above definition of Dvorak keyboard, a qwerty keyboard is the standard and is well understood.

Further, an example of the qwerty layout is contained on page 3, lines 8-14 of the specification. Additionally, a figure including the fully illustrated qwerty layout was filed in the parent application, but was required to be modified to show less than the full layout (see paper number 3 of application number 08/117,418, now U.S. Patent No. 5,531,529, of which this application is a continuation-in-part).

Also, the familiarity of the Dvorak and qwerty keyboard layouts is shown by one of the Examiner’s cited references. The Herzog et al. patent discusses these typical keyboard arrangements (col. 3, lines 51-60).

Therefore, the Dvorak and qwerty keyboard layouts are well known to those skilled in the art and the mere mention of their names is enough to create an understanding of what is being described. Thus, the Examiner is respectfully requested to withdraw the objection to the specification under 35 USC § 112, first paragraph.

Claims 24 and 28 -- 35 U.S.C. § 112, first paragraph

The objection to claims 24 and 28 under 35 USC § 112, first paragraph, is respectfully traversed. As discussed above, the qwerty and Dvorak keyboard layouts are well known to those skilled in the art. Further, illustration of these layouts is not necessary to their understanding, and was required to be removed by the PTO Draftsman in the parent application (as discussed above). Thus, the Examiner is respectfully requested to withdraw the objection to claims 24 and 28 under 35 USC § 112, first paragraph.

Claims 1- 28 -- 35 U.S.C. § 112, second paragraph

The objection to claims 1- 28 under 35 USC § 112, second paragraph, is respectfully traversed.

Applicant has amended claims 1 and 23 to positively recite that the keys have a keystroke travel range of about 0.9 millimeters to 6 millimeters. Support for this amendment may be found on page 10, lines 23-26 of the present Specification. Thus, the Examiner is respectfully requested to withdraw the objection to claims 1- 28 under 35 USC § 112, second paragraph.

Claims 1- 28 -- 35 U.S.C. § 103

The objection to claims 1- 28 under 35 USC § 103 over Wang in view of Herzog et al. and Klauber is respectfully traversed.

Applicant has amended claims 1 and 23 in the manner set forth above to place the application in condition for allowance. In particular, Applicant has amended claims 1 and 23 to recite that the keys have a keystroke travel range of about 0.9 millimeters to 6 millimeters.

In contrast to the presently claimed input apparatus, the keyboard disclosed in the Wang patent is a membrane keyboard and therefore does not have a meaningful keystroke travel range. The keys on a membrane style keyboard have limited, if any, keystroke travel range. Thus, the keys on the keyboard taught and sold by Wang do not have a keystroke travel range of about 0.9 - 6 millimeters, which is now specified in the present claims.

Moreover, the Wang patent specifically teaches the advantages of a membrane style keyboard, utilizing touch panel technology, over keyboards with "so-called full travel switches." Wang Patent, col. 5, lines 41-45. Thus, there is no teaching or suggestion in the Wang patent, nor any motivation in view of the Wang patent, for one of ordinary skill in the art to construct a keyboard which utilizes alphanumeric keys having a keystroke travel range of about 0.9 - 6 millimeters.

Further, the teachings of the Wang patent are directed to achieving a keyboard with a smaller footprint than a conventional keyboard by using stylus actuable keys, and not to meeting the nonobvious ergonomic needs of children and adults having hands smaller than normal adult male hands. As detailed in the Specification, page 3, line 12 to page 4, line 31, the ergonomic standards for a current input apparatus are based on use by adult humans. The Wang patent is

premised on fulfilling these human factors standards (col. 4, lines 11-41). Wang discloses that the minimum center-to-center distance of 19 mm is to be used for both horizontal and vertical square key spacing (col. 3, lines 61-68), in accordance with established standards (col. 4, lines 22-28 and 39-41). This minimum standard may be somewhat "relaxed" (col. 5, line 5), but only by fulfilling a minimum keypad area recommendation based on conventional human factors (col. 3, lines 48-53; and col. 4, lines 16-22 and 36-37). Again, these human factors are based on use by normal-sized adults. Thus, the unmet ergonomic needs of children and adults having hands smaller than normal adult male hands are neither contemplated nor appreciated by the Wang patent.

The Examiner's attention is also drawn to the Rule 116 response filed in the parent application. This response provides a detailed analysis of the Wang patent and sets forth with particularity additional reasons why the Wang patent does not teach or suggest the present claims.

Neither the Herzog et al. patent nor the Klauber patent make up for the deficiencies of the Wang reference. Herzog et al. discloses a keyboard which results in the operator obtaining a proper bio-mechanical alignment from the elbow to the fingertips. Herzog et al. teaches a relative offset of each row of keys, but does not disclose or suggest center-to-center spacing or keystroke travel range. Further, Herzog et al. does not appreciate or suggest the ergonomic problems faced by children or small-handed adults using keyboards.

Klauber discloses a keyboard for more effective backspacing and erasing mistakes without averting the eyes from the copy. Klauber teaches the placement of a backspace/erase key within the reach of a thumb. Similar to Herzog et al., Klauber does not disclose or suggest

center-to-center spacing or keystroke travel range. Also, Klauber does not appreciate or suggest the ergonomic problems faced by children or small-handed adults using keyboards. Thus, neither Herzog et al. nor Klauber make up for the deficiencies of the Wang reference.

Additionally, the subject matter of the present invention was found to be unobvious in Applicant's parent application serial number 08/117,418 now U.S. Patent No. 5,531,529.

Claims 6, 14, 18, 24, 26 and 28 depend from nonobvious independent claims, as explained above. Thus, they are considered to be in condition for allowance.

Independent claim 23 has been amended to more particularly point out the patentable features, as explained above, and is thus considered to be nonobvious and in condition for allowance.

Hence, as explained above, claims 1-19, 21-25 and 27-28 are clearly not obvious under the Wang patent in view of Herzog et al. and Klauber. These references, individually and in combination, fail to suggest and appreciate the keystroke travel range and ergonomic problems faced by children and small-handed adults. Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 1-28 under 35 U.S.C. § 103.

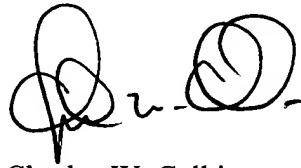
Claims 1 to 28 -- Obviousness-type Double Patenting

Claims 1-28 stand rejected under the judicially created doctrine of obviousness-type double patenting. Applicant has enclosed a terminal disclaimer to overcome this rejection.

Conclusion

A favorable Office Action is respectfully solicited as all objections and rejections are believed to be overcome, thus placing the present application in condition for allowance. The Examiner is invited to contact the undersigned at (910) 607-7315 to discuss any matter relating to the present application.

Respectfully submitted,



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